**Enhancing Active and Experiential Learning with Low-Cost Telescopes**

Inseok Song, Nandana Weliweriya, and Marni Shindelman

[Low-Cost Telescope Project Website](https://stemin3d.net/projects/low-cost-telescope)

Background  
Many students are attracted to astronomy initially because of the awe and beauty of celestial objects. However, students rarely have opportunities to see celestial objects with their eyes using telescopes even if they take astronomy courses. Even for astronomy majors, course activities using a telescope are greatly limited. Traditionally, night-time observations are carried out with expensive telescopes (8 inches to 14 inches in size with a price tag of up to a few thousand dollars) owned by the department, and such observations require students to be gathered at a campus at night which raises severalgreatly alleviated. Each student can carry out course activities individually at home and is exposed to active and experiential learning environments. With the advance of relevant technology & manufacturing, good quality optics have become cheap. A low-cost telescope (under $100, e.g., Celestron's FirstScope Telescope) is readily available nowadays. Equipped with a smartphone adapter, we can set up a low-cost telescope with a digital imaging detector within a manageable budget. For a typical size of a class of ~30 students, setting up the whole equipment costs about $3,000.

Suggested Course Redesigns  
This proposal seeks to revise the astronomy lab component of five existing Astronomy courses (ASTR 1010L, 1020L, 1110L, 2030L, and 3010) to be implemented in the Fall of 2024 as well as create a cross-listed course with the School of Art that is related to the topics of astronomy and photography to be taught in AY25. For the latter, the plan is to incorporate an outreach component in this course to encourage students to visit Clarke County Schools to share this technology with K-12 students. Along with the inclusion of low-cost telescopes, the team will build curriculum for these labs with these curricular components:

* An orientation on how to set up and use the telescope
* A tutorial on how to use specific camera apps (for iPhone and Android)
* Lesson on observations of known periodic variables [astronomical photometry project]
* Curriculum related to measuring brightness variations over time and recovering known periods
* Tutorial on observations of stellar clusters [astronomical photometry project]

|  |  |  |
| --- | --- | --- |
| **Office of Active Learning Funding Allocation** | | |
| Salary Support | 2 PI Faculty for Summer 2024 | $15,000 ($5,000 each)   * Inseok Song * Nandana Weliweriya, * Marni Shindelman |
| Telescopes | 35 Telescopes with smartphone adapters | $3,500 |